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Date: 6-25-01By: Deborah Brockmeyer

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:

Trost and Hachiya

EXAMINER: R. Desai

SERIAL NO.: 09/498,701

ART UNIT: 1625

FILED: February 7, 2000

FOR: CATALYTIC COMPOSITIONS AND METHODS
FOR ASYMMETRIC ALLYLIC ALKYLATIONAMENDMENT AFTER ALLOWANCE UNDER 37 C.F.R. §1.312(a)

Box Issue Fee
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Responsive to the Notice of Allowance mailed June 18, 2001, amendment of the claims in the above-identified application is respectfully requested. Please amend the above-identified application prior to issue, as shown below.

Following is the complete set of claims as currently amended, with the corrected numbering used by the Examiner (claims originally numbered 55-62 now numbered 53-60).

The complete set is shown for the sake of clarity. Applicants note that the present minor amendments, which correct dependency, affect only claims 54, 56, and 58-60. Enclosed, starting on a separate page following this response, is a marked copy of claims 54, 56, and 58-60 showing all changes relative to the previous version.

17. (Three times amended) A catalytic organometallic composition, wherein the composition is the product of a process which comprises contacting, in a nonprotic, noncomplexing solvent,

(a) a chiral ligand L¹ comprising:

(i) a chiral component derived from a chiral diamine, diol, or amino alcohol, said component having first and second chiral centers, each substituted with a group X selected from -O- or -NR-,

where R is hydrogen or lower alkyl,

wherein said chiral centers are connected by a direct bond or by a chain of one to three atoms comprising linkages selected from alkyl (carbon-carbon), alkyl ether (carbon-oxygen), alkyl amino (carbon-nitrogen), or a combination thereof,

and, linked to each said group X,

(ii) a heteroaryl binding group Cy_N having a ring nitrogen atom effective to bind to a metal atom selected from the group consisting of molybdenum, tungsten, and chromium,

wherein said binding group is linked to said group X at a ring carbon adjacent to said ring nitrogen atom, is optionally substituted with one or more groups selected from alkyl, alkenyl, aryl, aralkyl, alkoxy, aryloxy, acyl, acyloxy, amide, tertiary amine, nitro, or halogen, and may be fused to one or more additional rings,

with

(b) a hexacoordinate complex of a metal selected from tungsten(0), chromium(0), and molybdenum(0),

whereby said complex undergoes a ligand exchange reaction, such that L^1 becomes coordinated to said metal;

wherein said composition is effective to catalyze the enantioselective alkylation of an allyl group bearing a leaving group at its allylic position.

2/18. The composition of claim 17, wherein in said process said metal is molybdenum (0).

3/19. The composition of claim 17, wherein in said process said hexacoordinate complex comprises ligands selected from the group consisting of CO, cycloheptatriene, lower alkyl nitrile, and lower alkyl isonitrile.

4/20. The composition of claim 17, wherein said first and second chiral centers are further substituted with groups R^1 and R^2 , respectively,

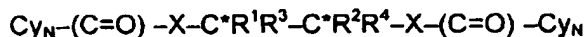
wherein R^1 and R^2 are independently selected from aryl, heteroaryl, aralkyl, carbocycle, or heterocycle, and are optionally substituted with one or more groups selected from alkyl, alkenyl, aryl, aralkyl, alkoxy, aryloxy, acyl, acyloxy, amide, tertiary amine, nitro, or halogen, or

R^1 and R^2 together form a carbocyclic or heterocyclic ring, which is optionally substituted with one or more groups selected from alkyl, alkenyl, aryl, aralkyl, alkoxy, aryloxy, acyl, acyloxy, amide, tertiary amine, nitro, or halogen, and which may be fused to one or more additional rings.

5/21. The composition of claim 20, wherein said chiral centers are connected by a direct bond, and

said chiral component is thereby derived from a chiral 1,2-diol, -diamine, or -amino alcohol.

⁶ ~~54.~~ (Twice Amended) The composition of claim ⁴ ~~26~~, wherein said ligand L₁ has the structure



wherein said chiral centers are connected by a direct bond, R¹ and R² are as defined above, R³ and R⁴ are hydrogen, and binding groups Cy_N are as defined above.

⁷ ~~55.~~ (Twice Amended) A catalytic organometallic composition, wherein the composition is the product of a process which comprises

contacting, in a nonprotic, noncomplexing solvent, a chiral ligand L¹ comprising:

(a) an axially chiral 1,1'-binaphthyl system, said system substituted at its 2 position and at its 2' position with a group X selected from -O- or -NR-, where R is hydrogen or lower alkyl, and, linked to each said group X,

(ii) a heteroaryl binding group Cy_N having a ring nitrogen atom effective to bind to a metal atom selected from the group consisting of molybdenum, tungsten, and chromium,

wherein said binding group is linked to said group X at a ring carbon adjacent to said ring nitrogen atom, is optionally substituted with one or more groups selected from alkyl, alkenyl, aryl, aralkyl, alkoxy, aryloxy, acyl, acyloxy, amide, tertiary amine, nitro, or halogen, and may be fused to one or more additional rings;

with a hexacoordinate complex of a metal selected from tungsten (0), chromium (0), and molybdenum(0),

whereby said complex undergoes a ligand exchange reaction, such that L¹ becomes coordinated to said metal;

wherein said composition is effective to catalyze the enantioselective alkylation of an allyl group bearing a leaving group at its allylic position.

⁷ ~~56.~~ (Amended) The composition of claim ¹ ~~55~~, wherein in said process said metal is molybdenum (0).

⁹ ~~57.~~ The composition of claim ¹ ~~17~~, wherein said solvent is selected from the group consisting of ethers, hydrocarbon solvents, and mixtures thereof.

⁹ ~~58.~~ (Amended) The composition of claim ⁹ ~~57~~, wherein said solvent is selected from the group consisting of THF, toluene, and mixtures thereof.

11⁷ ~~59~~ (Amended) The composition of claim ~~55~~⁵⁷, wherein said solvent is selected from the group consisting of ethers, hydrocarbon solvents, and mixtures thereof.

12¹¹ ~~60~~ (Amended) The composition of claim ~~59~~⁶¹, wherein said solvent is selected from the group consisting of THF, toluene, and mixtures thereof.

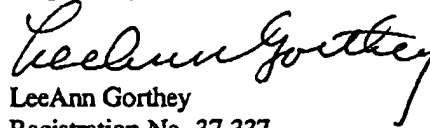
REMARKS

The present amendments correct the dependency of claims 56 and 58-60, in view of the renumbering of the claims. The dependency of claim 54 is also changed from claim 17 to claim 20, since the variables R¹ and R² are defined in the latter claim.

The amendments requested do not increase the scope of the patent claims. Acceptance of the amendments and issuance of the patent in the amended form is respectfully requested.

No fees are believed necessary with this communication. However, the Commissioner is hereby authorized and requested to charge any deficiency in fees (or to credit any overpayment) herein to Deposit Account No. 04-0531.

Respectfully submitted,


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